



## *Florida Department of Transportation*

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### MEMORANDUM

**TO:** All Users of the Florida Department of Transportation ***Structures Manual***

**FROM:** Robert Robertson, State Structures Design Engineer

**COPIES:** Brian Blanchard, Assistant Secretary for Engineering and Operations; Tom Byron, Chief Engineer; Tim Lattner, Director, Office of Design; Assistant State Structures Design Engineers (Thomas Andres, Andre Pavlov, Dennis Golabek, Charles Boyd and Will Potter); Larry Jones, State Geotechnical Engineer; Jeffrey Pouliotte, State Structures Maintenance Engineer; District Structures Design Engineers (Andra Diggs, Rod Nelson, Keith Shores, Ramón Otero, Neil Kenis, Hailing Zhang, Gautom Dey and Russ Snyder); District Structures Maintenance Engineers (James Jacobsen, Keith Campbell, Rodney Chamberlain, Thomas Reynolds, Ed Kestory, Dennis Fernandez and Aran Lessard); Jeffery Ger, FHWA

**SUBJECT:** January 2016 ***Structures Manual*** (625-020-018)

The Florida Department of Transportation Structures Design Office has officially released the January 2016 ***Structures Manual*** with an effective date of January 1, 2016. The ***Structures Manual*** can be found on the Structures Design Office website at:

<http://www.dot.state.fl.us/Structures/StructuresManual/CurrentRelease/StructuresManual.shtm>

The ***Structures Manual*** is provided in PDF format and includes hyperlinks, bookmarks and search capabilities. The ***Structures Manual*** can be viewed online or it can be installed on your computer. To install the ***Structures Manual*** on your computer, click on the FDOT icon at the above website and follow the prompts to complete the installation. An icon (blue for 2016) will be added to your Desktop, which you may then click to launch the ***Structures Manual***. If you already have a previous edition of the ***Structures Manual*** installed on your computer, installation of the 2016 ***Structures Manual*** will not overwrite it.

The ***Structures Manual***, updated every January, is the primary source for FDOT structural design criteria. The design criteria found in the ***Structures Manual*** shall be incorporated on all future projects and on those projects currently being developed (i.e., when design and detailing have not already reached final stages). Submit design exceptions or variations in accordance with Chapter 23 of the ***Plans Preparation Manual, Volume 1***.

For questions about the **Structures Manual**, or its application to a particular project, contact the appropriate District Structures Design Office.

To improve or further develop the **Structures Manual**, submit suggestions to Charles Boyd, Florida Department of Transportation, 605 Suwannee Street, MS 33, Tallahassee, Florida 32399-0450.  
([e-mail charles.boyd@dot.state.fl.us](mailto:charles.boyd@dot.state.fl.us)).

## **Structures Manual January 2016 Revisions**

### **Structures Manual Introduction**

I.6 ..... Updated references in Paragraphs B.5, B.7 and C.5.

### **Volume 1 – Structures Design Guidelines**

I.3 ..... Updated cross references in Table I.3-1.

1.4.1 ..... Revised  $K_1$  value in Paragraph A; Revised Paragraph A Commentary; Revised Paragraph B; Added new Paragraph E.

1.4.3 ..... Revised Paragraph B and associated MNCP box; Revised Table 1.4.3-1; Revised Paragraph C and added new MNCP box; Added new Table 1.4.3-2; Revised Paragraph G.2 per SDB 15-10.

1.4.5 ..... Updated PPM reference in Paragraph C.

1.9 ..... Updated PPM references in Paragraphs C and D; Revised Appendix 1A.

1.11 ..... Added new Section per SDB 15-03 with subsequent modifications.

1.12 ..... Added new Section per SDB 15-09.

2.2 ..... Revised footnote 1 of Table 2.2-1.

2.6.1 ..... Changed "horizontal clearance" to "lateral offset" in Paragraphs B and C to match PPM terminology.

2.6.3 ..... Changed "horizontal clearance" to "lateral offset" in Paragraph B to match PPM terminology.

2.6.4 ..... Updated PPM references in Paragraphs A and C.

2.9 ..... Revised Paragraph A; Added Paragraph D.

2.10 ..... Revised Paragraph B.

3.1 ..... Added new Paragraph H.

3.3 ..... Clarified Paragraph A.1 MNCP Box; Revised Paragraphs A.2 and B.

3.5.1 ..... Revised Paragraph F and added new Table 3.5.1-1 per SDB 15-10 with subsequent modifications.

3.6.3 ..... Revised LRFD cross reference; Revised footnote references in Table 3.6.3-1.

- 3.11.1 ..... Revised Paragraphs E and G; Added new Paragraphs H, I and J; Revised Tables 3.11.1-1 and 3.11.1-2; Added Table 3.11.1-3 per SDB 15-03 with subsequent modifications.
- 3.11.3 ..... Revised Paragraph D per SDB 15-03.
- 3.11.5 ..... Added Commentary to Paragraph B.
- 3.12 ..... Revised Figure 3.12-1.
- 3.12.1 ..... Added new Paragraph H.
- 3.12.7 ..... Revised Paragraphs C; Deleted last sentence of Paragraph D and associated Commentary.
- 3.13.1 ..... Revised Paragraphs D and F and deleted Table 3.13.1-1 and Figures 3.13.1-1 through 3.13.1-7 per SDB 15-07.
- 3.13.2 ..... Revised Paragraph J.3; Revised Paragraph M; Added new Paragraph N.8 and renumbered subsequent Paragraph; Revised Paragraph O; Added Figures 3.13.2-6, 3.13.2-7 and 3.13.2-8.
- 3.13.4 ..... Revised values in Paragraphs M.1 and M.2; Added new Paragraph P.
- 3.14.3 ..... Added Commentary to Paragraph D.5.
- 3.16.5 ..... Updated PPM reference.
- 3.17.11 ..... Clarified Paragraph A; Revised Paragraphs B and C; Added Paragraph D.
- 3.19 ..... Added cross reference to Commentary.
- 4.1.7 ..... Revised Section.
- 4.1.9 ..... Added new Section per SDB 15-03.
- 4.2 ..... Revised entire Section.
- 4.3.1 ..... Revised Paragraph C.5 and associated MNCP box; Revised Paragraph G; Added Paragraph I; Relocated requirements of Table 4.3.1-2 to new SDG Table 1.4.3-2.
- 4.3.4 ..... Revised Section per SDB 15-06 with subsequent modifications.
- 4.4 ..... Revised entire Section.
- 4.5 ..... Revised Section per SDB 15-03 with subsequent modifications.
- 4.6 ..... Revised Section per SDB 15-03 with subsequent modifications.
- 4.8.3 ..... Revised Paragraph A.
- 4.9 ..... Added new Section and new Figure 4.9-1.
- 5.1.5 ..... Added new Section.
- 5.6.2 ..... Added second sentence to Paragraph D.2.
- 5.13 ..... Added new Section.
- 6.2 ..... Deleted second sentence of Paragraph A.
- 6.4.1 ..... Revised Paragraph C.

- 6.5.1 ..... Revised Paragraph B.
- 6.7.4 ..... Deleted references to Design Standard Index 403 in Paragraph A.2 and Commentary;  
Updated PPM reference in Paragraph A.2; Revised the variable  $M_u$  definition in  
Paragraph D, Eq. 6-3; Added new Paragraph E.
- 6.7.8 ..... Updated PPM reference.
- 6.7.9 ..... Clarified the description of the variable W in Paragraph A.
- 6.10 ..... Updated PPM reference in Paragraph C.
- 7.1.1 ..... Deleted Paragraph C.3 and renumbered subsequent Paragraph; Revised Figure 7.1.1-1.
- 7.1.5 ..... Added new Section.
- 7.6 ..... Clarified Paragraph D Commentary.
- 9.2 ..... Revised some unit prices.
- 10.4 ..... Clarified cross reference in Paragraph A; Updated PPM reference and terminology in  
Paragraph F.3.
- 10.5 ..... Clarified second Paragraph.
- 10.12 ..... Revised Special Height Bicycle railing dimension in Paragraph C.2.
- 11.6 ..... Added new Section per SDB 15-06.

## **Volume 2 – Structures Detailing Manual**

Revised all cross references from CPCH to CADD Manual throughout Volume 2.

- 2.8 ..... Deleted Paragraph D MNCP Box.
- 4.3.11 ..... Clarified Section title and Figure 4.3.11-1 title.
- 5.2 ..... Revised Paragraph A.3; Revised Paragraph F.3 per SDB 15-06; Added new Paragraph G.1;  
Revised cover requirement in Paragraph G.3.
- 5.3 ..... Revised Paragraph C.1.
- 5.4 ..... Clarified first Paragraph and added new Example Paragraph 3.
- 6.3 ..... Revised Paragraph A.
- 7.1 ..... Added new Paragraph E and renumbered subsequent Paragraph.
- 7.3 ..... Added new Paragraph W.
- 7.4 ..... Added new Paragraph D and renumbered subsequent Paragraphs.
- 11.2 ..... Added new Paragraph N and renumbered subsequent Paragraphs.
- 12.3 ..... Revised Paragraph F and Commentary; Revised Paragraph G; Added Paragraph J and  
Figure 12.3-1.
- 12.6 ..... Revised Paragraph C and added new Figure 12.6-1; Renumbered subsequent Figures.
- 13.5 ..... Revised Figure 13.5-1.

- 13.7 ..... Revised column offset dimension in Paragraph H and Figure 13.7-3.
- 14.3 ..... Revised Paragraph A.4; Added new Paragraph A.8.
- 15.2 ..... Added new Paragraph R per SDB 15-06.
- 15.3 ..... Added new Paragraph Q.
- 15.4 ..... Revised Paragraphs D and E.
- 15.5 ..... Revised first paragraph; Added new Paragraph K and new Figure 15.5-3 per SDB 15-06; Added new Paragraph L and new Figures 15.5-4 and 15.5-5.
- 15.8 ..... Revised Figure 15.8-5.
- 16.12 ..... Added new Paragraph G.
- 19.1 ..... Clarified cross reference in Paragraph B.
- 19.5.2 ..... Revised Paragraph G and corrected cross reference in Paragraph H.
- 19.6.1 ..... Revised Paragraph B and deleted associated Commentary and MNCP Box; Revised Figure 19.6.1-3.
- 19.7.2 ..... Clarified Plan requirements in 3rd Paragraph and MNCP box.
- 20.9 ..... Revised Paragraph.
- 21.2.2 ..... Clarified requirements of Paragraph L.
- 22.2 ..... Revised first Paragraph and numbered it as Paragraph A; Added new Paragraph B and renumbered subsequent paragraphs; Revised MNCP box to apply to Paragraphs A and B; Revised Paragraph D; Clarified title of Figure 22.2-4.
- 23.7 ..... Revised Paragraph A per SDB 15-06; Replaced Figures 23.7-1 and 23.7-2 per SDB 15-03.
- 23.8 ..... Revised Paragraph J per SDB 15-03.
- 24.2 ..... Revised Paragraph A.5.
- 25.3 ..... Added new Paragraph M and Commentary.
- 25.3.1 ..... Clarified Paragraph B Commentary; Revised Table 25.3.1-1 to add new Footnote 3, renumbered subsequent Footnotes, and revised joint width requirements.
- 25.3.3 ..... Revised Figure 25.3.3-1; Deleted Paragraph G; Deleted Figures 25.3.3-5 and 25.3.3-6.
- 25.4.3.8 ..... Revised Paragraph H.
- 25.4.3.9 ..... Revised Paragraph E.
- 25.4.3.10 ..... Revised Figures 25.4.3.10-1 and 25.4.3.10-2.

**Volume 3 - FDOT Modifications to Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (LTS-6)**

- 3.8.6 ..... Revised the requirements of Section; Added paragraph to Commentary; Added new FDOT Figure 3.8.6-1.
- 5.15.1 ..... Clarified Section and Commentary.

- 5.16 ..... Clarified Section and Commentary.
- 5.17.3.3 ..... Deleted reference to monotube structures from second Paragraph.
- 10.5 ..... Clarified camber requirements and revised commentary.
- 13.6.1.1 ..... Revised definition of  $T_n$  and related variables; Revised Commentary.
- 13.6.2.1 ..... Clarified reinforcement requirements; Revised Commentary to address use of mass concrete and reinforcement spacing.
- C.1 ..... Clarified conditions under which a Design Variation/Exception is not required.

**Volume 4 - Fiber Reinforced Polymer Guidelines**

- 1.3 ..... Revised Paragraph C.
- 2.2 ..... Clarified cross reference in Paragraph B.
- 3.1 ..... Revised paragraph to reference new SDG Table 3.5.1-1 for additional pile requirements.
- 4.2 ..... Revised Section to be in accordance with ACI 440.2R-08.